ABSTRACT OF THE DISCLOSURE

By tapering the diameter of a flanged barrel laser rod over its length, the maximum trapped path length of a barrel mode can be dramatically reduced, thereby reducing the ability of the trapped spontaneous emission to negatively impact laser performance through amplified spontaneous emission (ASE). Laser rods with polished barrels and flanged end caps have found increasing application in diode array end-pumped laser systems. The polished barrel of the rod serves to confine diode array pump light within the rod. In systems utilizing an end-pumping geometry and such polished barrel laser rods, the pump light that is introduced into one or both ends of the laser rod, is ducted down the length of the rod via the total internal reflections (TIRs) that occur when the light strikes the rod's barrel. A disadvantage of using polished barrel laser rods is that such rods are very susceptible to barrel mode paths that can trap spontaneous emission over long path lengths. This trapped spontaneous emission can then be amplified through stimulated emission resulting in a situation where the stored energy available to the desired lasing mode is effectively depleted, which then negatively impacts the laser's performance, a result that is effectively reduced by introducing a taper onto the laser rod.